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* THE ROLE OF THE DEAD SPERM

by

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THE embryologist's interest in the spermatozoon is but natural. It fertilizes the ovum to start the life of a new being; hence it presents itself with considerable importance at the commencement of embryological studies. But the fate of the multi-million comrades of the one functionally successful sperm remains unchronicled. Recently there has been some emphasis of the role played by the dead sperms towards the achievement of the fertilizing sperm by contributing an enzyme hyaluronidase. There is more to think of than has yet been brought out in any presentation of the various aspects of the problem. "When rich people die, the riches do not die with them". They are left as legacies. Who are the beneficiaries of the biological riches carried by the dead sperms? This question has been in my mind not for days but for years. And I give you here a brief survey of the thoughts that have germinated in my mind.

Chemical Composition

The cells most richly endowed with a concentration of some of the essential ingredients for the physical make up of life are the spermatozoa. In this respect they are far superior to their counterpart, the ova which are more loaded with ordinary nutriment. The male body utilises with top priority in their manufacture its resources of the basic biochemical materials that go to the composition of nucleoproteins etc. so essential to every form of biological growth and cell division. Among the multimillions of spermatozoa produced during the lifetime of a male just a few sperms i. e. the number corresponding to the number of children fathered by him find the fulfilment of the sperm's natural role of embryogeny. All the others perish somewhere or other and leave their load of precious cargo of biochemical material where ever they are laid dead.

First we will consider the nature of the biochemical ingredients composing spermatozoa. Then we will take up the sites of their death and disintegration wherefrom their ingredients could be absorbed.

Protein analysis of sperms has shown that they contain arginine, glutamic acid, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophane, valine etc. The sperms contain iron, zinc and copper in combination with proteins. They also contain cytochromes. The spermhead is a mass of packed chro-

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matin material and contains nucleoproteins, desoxyribonucleic acid, the basic nuclear proteins, protamines and histones, and the non-basic nuclear proteins, karyogen and choromosomin. Apart from all these the sperms contain the enzyme hyaluronidase which is a spreading factor. It leaks out of the sperms to dissolve the mucoid gel of cells and intercellular cement substance for the ostensible purpose of facilitating the sperm's passage and invasion. However, hyaluronidase also facilitates the absorption and spread of all absorbable substances locally at site and to a very small extent generally everywhere in the animal body.

In addition to these substances definitely known to be derived from the spermatozoa themselves there are certain substances present in the seminal fluid which may or may not be derived from the sperm. These substances are constantly present in the fluid in which sperms occur that their mention will not be out of place. These include a substance which is capable of stimulating contraction of the uterus and corresponds in its action to that of acetylcholine. There are substances which increase the blood pressure and stimulate breathing, probably adrenaline and noradrenaline or others. The seminal fluid further contains oestrogens and androgens in small quantities. There is a substance spermin which is bacterostatic to many organisms. There are also lipoids, sugars and certain organic acids. All these substances which occur along with the sperms are also likely to be absorbed from the places where sperms are located or deposited.

Life of the Sperm

It has been estimated that in the rat the time taken for the production of spermatozoa from the spermatogonia is about three weeks. It is apparently a slow process. But at any moment millions of them are being formed.

Live sperms have been found in the vas deferens of rabbit upto 10 days after castration ; and about 2 to 3 weeks is the precautionary time mentioned when live sperms are likely to occur in the human ejaculate after vasectomy.

In the female genital tract live sperms are known to survive for a few days. Maximum estimates of about 10 days in the rabbit and a week in the human have been mentioned. However, Bailey and Miller are quoted as having found human sperms 3½ weeks after coitus. This period is generally considered as exceptional. Sobotta considers that sperms live in the female genital tract of the mouse only a few hours ; and Hoehne and Behne found that in the guinea pig they did not survive more than 3 days.

The general opinion is that human sperms survive in the female genital tract only for a few days and that the sperms continue to remain viable stored in the male ducts for a period of a few weeks. Then they disintegrate and the products are absorbed.

Sites where sperms perish.

1. The sperm shoal round the ovum :-

The old view was that the two to three hundred million spermatozoa emitted in each ejaculation were another instance of nature's profligate waste that we see in many aspects of her biological economy. It made ample provision for at least one in the host reaching the purposive goal. But recently the idea has gained ground that the one sperm that fertilizes is made capable of carrying out its function because of the effective help rendered by millions of its comrades who leak out the substance hyaluronidase, an enzyme that liquefies by depolymerization the gel in the cumulus cells that surround the mature ovum.

The site of fertilization is usually the upper part of the tube.

Of the millions of spermatozoa deposited in the vagina a considerable number swim up to the interior of the uterus and into the tubes. The ovum is usually fertilized in the ampullary part soon after it has obtained entry into the tube. The concentration of hyaluronidase is directly related to the sperm density in the medium. Thus though many millions of the sperms perish they contribute a very valuable ingredient to the medium surrounding the egg to dissolve the gel so that the fertilizing spermatozoon is enabled to pierce through the cumulus to effect fertilization.

It has been demonstrated that rabbit sperm suspensions of low density obtain increased fertilizing capacity when mixed with suitable medium containing hyaluronidase derived from extraneous sources like bull semen.

Hyaluronidase or hyalase is a useful therapeutic agent administered along with other drugs to facilitate their quicker absorption. Some micro-organisms utilize this or similar substances as a spreading factor for facilitating their invasion of tissues. The actual mechanism of these spreading factors seems to be depolymerization of the hyaluronic acid in connective tissue or in the cementing substance between the cells. This breaking down of complex substances may produce simpler substances usable by the bacteria for nutrient purposes also apart from facilitating invasion inside. Applying the same principle we are justified in assuming that the breaking down of the cumulus not only favours fertilization but also helps in the nutrition of the ovum. It has been reported that the clinical use of hyaluronidase in cases of male infertility has not given results of increasing the fertility as expected. The explanation might be that the medium containing hyaluronidase which is injected inside spreads only to the regional limit reached by the artificial insemination. From this spot onwards the spermotozoa alone swim up to the ovum. The injected pabulum is left behind. The live sperms are less in total count and so are inadequate to liberate a high concentration of hyaluronidase at the actual site around the ovum. It would be necessary to have a larger number of the sperms living or dead at site to contribute to the necessary concentration of hyaluronidase.

2. The transported sperms in vagina, uterus and tubes :—

Of the large numbers of sperms deposited in the female genital passages during mating a certain number perish in the vagina in a few hours and others that reach the uterus and the tubes die in a few days.

Though actual menstrual bleeding occurs only in monkeys, apes and the human female, the great similarity between the phases of the oestrus cycle in mammals and the phases of the monthly cycle in the monkeys, anthropoid apes and human suggests a general commonality of function and structual changes with only individual species differences. The cycle appears to be a physiological " inflammatory " process caused by hormonal agencies in certain target organs. The correspondence to an inflammatory process is all the more appropriate due to the extensive invasion of leucocytes at certain phases. Normally the area does not show infection nor a frank purulent exudate in spite of the massing of leucocytes. Though some of the leucocytes are discharged out most of them return back to the vascular system. These leucocytes serve a useful purpose in disintegrating and liquefying other cells and phagocyting the debris. The dead sperms left over in the whole extent of the female genital tract and especially within the uterus are also dealt with similarly. Spermatozoa have been observed migrating into each and every recess and gland duct in the uterine endometrium going forth in their blind search for the ovum. Wherever they die they disintegrate and the products of their dissolution are reab-

sorbed or their disintegrated debris are swallowed up and carried inside by the leucocytes. Thus whatever chemical material is contained in the debris of dead sperms is received into the blood circulation of the female organism.

One of the important constituents thus absorbed inside would be the enzyme hyaluronidase released from dead sperms. The question whether hyaluronidase could be absorbed from a local depot and carried into the blood stream and whether apart from its action at local site a generalized action could be conceived for the absorbed and circulating hyaluronidase are questions of an intriguing nature and require further investigation. Even if a slight quantity of absorption is assumed there are substances in the serum which would inhibit the action of the absorbed hyaluronidase. Elster et al have observed the facilitation of the passage of locally injected dye when young rats were intravenously injected with higher doses of hyaluronidase. This would suggest that at least as a transitory phenomenon a slight generalized effect could be produced from local absorption of hyaluronidase prior to it being destroyed or inhibited in the serum. The addition of hyaluronidase has been found useful in phenol sulfophthalein excretion tests and in urology where it hastens the excretion of radio-opaque material. These are definite proofs confirming the action of the drug while in circulation. The possibility of a general action is thus beyond doubt.

If this be granted, then the absorbed hyaluronidase would favour an increased capillary permeability and an augmentation of all absorptive phenomena of a physiological nature including better absorption of digested food from the gastro-intestinal tract.

Among the other biochemical substances produced from the disintegration of dead sperms and occurring in seminal fluid are some of the essential amino acids, nucleoproteins and male and female sex hormones. These are also absorbed. All these do benefit the female organism by slight but continuous improvement of physiological functions. The general physical improvement in the female organism usually noticed especially during the early years after marriage and even later, might be due to pharmacodynamic effects of biochemical substances absorbed from semen apart from the psychic enjoyment of a fulfilled sex life.

Among the local effects of the presence of hyaluronidase derived from sperms deposited in the female genital tract is the possibility of an easier spread of invasion of infective organisms mixed therewith. The fluids of the female genital tract and the seminal plasma do contain some substances bacteriocidal and bacteriostatic to many organisms. But the infections which are not thus controlled have a greater chance of spreading in due to the presence of hyaluronidase. The extreme susceptibility to local infection in venereal diseases is possibly due to the accompaniment of spermatozoal hyaluronidase with the organisms. This facilitating factor in the infectivity of venereal diseases is to our knowledge emphasised for the first time.

3. The sperms in the seminiferous tubules and passages in the male.

We have seen that the mature sperm remains viable in the male genital tract possibly upto a period of a few weeks after being produced in the seminiferous tubule. In a healthy human male leading a normal mating life the interval periods between ejaculations usually do not go to a few weeks. In such a person dead spermatozoa are not generally to be expected to be contained in any part of the male generative system. The last part of the ejaculate is the secretion of the seminal vesicle and normally this would wash out all live sperms from the male urethra and the ejaculatory duct. The other parts of the male generative system would

contain dead sperms only during times of prolonged abstinence or to use a better term during prolonged sexual continence. The latter term is better as it also excludes involuntary emissions.

To elaborate the thesis further it is necessary to go into some details on the functional anatomy of the male gonad and its duct system.

The histological structure of the normal seminiferous tubule is familiar to us. From the spermatogonia near periphery at the basement membrane, proliferation gives rise to primary spermatocytes which after miosis or halving of chromosomes become secondary spermatocytes which divide to form spermatids that are transformed into sperms. These changes are noticeable in the transverse section of an actively functioning seminiferous tubule in order from basement membrane to lumen. In the transformation of spermatids to sperms the cells of Sertoli, which are pillar like elements placed on the basement membrane between the spermatogonia, play an important part. Spermatogenesis is a continuous and continuing process from adolescence onwards in the normal healthy human male.

A point of great importance which is not usually stressed is the fact that if a reconstruction of a long stretch of seminiferous tubule is made the epithelium changes from location to location and it is not everywhere that the typical spermatogenetic process is noticed. Different parts of the tubule along its length are in different phases of functional activity as if this were a cyclical phenomenon at each location and different sites have the phases set in unison or disharmony in an apparently fortuitous manner. Some stretches of the tubule may be in a resting phase with low walls and no contained sperms alternating with parts where spermatogenesis is extremely active.

This recalls to mind the different time phases of a thousand clocks in a clock manufacturer's workshop which are wound to run but without adjustment to a standard time. Though the clocks run in approximately equal cyclical phases they soon get out of step. Such an explanation would enable us to understand the menstrual cycle in women now out of phase in individuals though probably originally linked to nature's seasons of phases of the moon as in some lower animals when in all individuals they occur all together. It is assumed that spermatogenesis in the male also was originally seasonal in man's remote ancestors. As control over the seasonal environment was obtained and continuing maintenance of nutrition throughout the year was ensured, breeding and spermatogenesis also became a continuous process. This was achieved by different parts of the seminiferous tubule getting out of phase in their activity.

Our purpose in alluding to this aspect of spermatogenesis is to state that the seminiferous epithelium is not everywhere in a continued state of activity. It undergoes periodical atrophy and regeneration at different situations. Atrophied seminal epithelium always retains the capacity for regeneration under favourable conditions. Apart from the cycle of degeneration and regeneration of the seminal epithelium which we have mentioned as occuring in normal healthy adults, we have to mention the occurrence of relative or nearly total atrophy of seminal epithelium in some pathological conditions e. g. during infectious diseases, dietic deficiency due to vitamin lack or gross under nutrition, toxic states like alcoholism and exposure to noxious physical agencies like x-rays or high temperature during hyperpyrexia. A temporary sterilization might be produced in such pathological conditions, but recovery takes place when normal general health is restored if the cells have not been totally destroyed or inflammatory fibrosis of the testis or its blood

supply has not supervened. This indicates the potential capacity for regeneration possessed by the germinal epithelium of the testes. This inherent capacity for regeneration is also noted in cryptorchism. In animals of species in which the testes are normally scrotal, the ectopic position in abdomen or inguinal canal causes degeneration of the germinal epithelium. Operative replacement of the testis with intact blood supply into the scrotum usually results in regeneration of the germinal epithelium even after many years of dormancy unless the degeneration has become very advanced or pathological changes have supervened. This would also point to the inherent regenerative capacity of the germinal epithelium after a temporary atrophy or degeneration.

In the case of animals that breed seasonally the activity of the seminiferous tubules commences at a particular month, reaches maturity and subsequently undergoes atrophy during the nonbreeding season. At that time the spermatogonia and cells of Sertoli become very few and the tubules get atrophied and the testis becomes very small as compared with its weight and size during the functional state. In some instances where the funicular process is patent as in the hare the atrophied or quiescent testes are withdrawn into the inguinal canal or abdomen. Again during the next breeding season the testes descend to the scrotum and a new regenerated cycle commences with renewed sexual activity. This is another instance to exemplify the regerative capacity of the gonadal germinal epithelium.

Now reverting to the normal functional testis, a continuous slow current dependent on the fluid pressure inside the tubules carries the sperms into the ductuli efferentes and the duct of the epididymis and further peristaltic action of duct musculature carries them into the vas deferens and seminal vesicles. The sperms closely packed in the smaller ducts are immobile and remain viable for a longer time as compared with those that enter the seminal vesicle, become mobile and perish erelong. In prolonged sexual continence the accumulated sperms die and the products of their disintegration are absorbed.

There is experimental evidence regarding the capacity for resorption possessed by the epithelium of the ducts as it has been seen to take in particles of dyes injected intravitam into them.

There is considerable difference of opinion as regards the function of the seminal vesicle. Many workers consider that the storage of sperms in it as in a receptacle does not usually happen. According to them its main function is secretory and the presence of sperms is due to stray migration or overflow from the duct system.

The seminal vesicle is an accessory sex gland and like the prostate discharges its secretion at the same time with the testis and its duct system in the seminal ejaculation. The vesicle shows maximum functional activity during mating; the seminal vesicle undergoes atrophy in castration.

The order of discharge of glandular secretions in the ejaculated fluid is the secretions of Cowper's gland during preliminary stages and then the prostatic secretion and the testicular secretion and lastly the vesicular secretion. The vesicular secretion removes the last lingering sperms from the male urethra. After ejaculation no dead sperms are left to perish in the male urethra. Because the ejaculatory duct is very narrow and closed by sphincteric muscle the seminal vesicle in man becomes a passive store house for the sperms that enter in from the ductus deferens by the flow of current caused by ciliary action or peristaltic contraction of different parts of the testicular duct system. The ampulla of the ductus deferens has also a similar

function as the seminal vesicle. So the vesicles would contain spermatozoa in all cases where they could overflow after filling the proximal sections of the testicular duct system. In any case it is quite reasonable to suppose that during long periods of sexual continence the spermatozoa accumulate in the seminal vesicles and ampullae also after filling up the duct system.

The sperms in the seminal vesicle are activated by the vesicular secretion from the time of reaching the vesicle, while those in the rest of the region would be closely packed and immobile and capable of becoming active on ejaculation. The older sperms that have reached the seminal vesicle earlier would possibly lose their mobility after a time and would soon perish if not discharged. The first ejaculate in repeated ejaculation consists of such "old" sperms, while the subsequent ejaculate contains a larger percentage of more active sperms. This has been demonstrated especially in cattle breeding.

The sperms that gather in the seminal vesicles during periods of sexual continence if they stay long enough to exhaust their activity die therein and their disintegration products are reabsorbed from the vesicle. It is a point worth stressing that they perish sooner in the seminal vesicle than in the duct system. But the vesicular secretion has to remain undischarged if resorption has to take place.

The phasic phenomenon of the germinal epithelium of the male gonad becomes understandable on general biological considerations.

Thus in a healthy adult even under prolonged sexual continence the gonadal germinal epithelium is very much similar to that in the healthy adult leading a normal sex life. The story of the sage Parasara who fathered the great Vyasa by the fisher girl Matsyagandhi and many other instances in our epic and puranic literature are familiar to us. Our scientific argument has lead us to the same conclusion that the human male who might be sexually continent for any length of time always continues to retain his sexual efficiency.

Further, prolonged sexual continence enables the male to reabsorb into himself the "precious" biochemical substances released from the disintegrating sperm. This is an example where the individual benefits in his own personal life by the stuff that nature has wisely provided for the perpetuation of the life of the species. The nature of this precious "cargo" so beneficial to the economy of life has been mentioned earlier. Evolving man has utilized nature's laws and nature's wares more and more. to his own benefit. Here we have pointed out another instance where man can utilize something in himself to his own individual personal benefit.

Our ancients in India knew the great tonic effects of **brahmacharya** or prolonged sexual continence. It need not necessarily be absolute. Modern civilization does not understand it. We have proved by facts and data of modern science and reasonable arguments that our ancients were very correct in their outlook. Even if one may not be able to achieve the very rigorous standards set by the Indian **Rishis**, occasional prolonged periods of sexual continence are bound to go good to any man.

4. The sperms in the vasectomised male : In the experimentally Vasectomised rabbit buck it has been shown that at the end of 18 months the testes showed normal weight and well developed seminiferous tubules with spermatozoa. But it has been found that atrophy of seminiferous tubules may occur immediately after operation ; and regeneration takes place subsequently. If the vas deferens was only sectioned without ligature the

initial atrophy did not occur. But eventually the duct closes even with simple sectioning.

An initial atrophy of germinal epithelium with hypertrophy of interstitial cells has been observed by some workers. But the germinal epithelium regenerates again; and the interstitial cells do not show any alteration from the original condition. There is considerable difference of opinion between different reports on the question of the interstitial cells. But it is definite that if the blood supply of the testis has not been interfered with and there has been no alteration in position of the testis then the germinal epithelium regains function after vasectomy. The spermatozoa produced do not find an outlet and consequently they accumulate and perish in the intact regions of the duct system to be disintegrated, dissolved and reabsorbed.

5. Immunization with dead sperm for contraceptive purposes :

As early as 1890 Metchnikoff discovered that he could immunize guinea-pigs to rabbit spermatozoa. Similarly Landsteiner found in 1899 that if guines-pigs are immunized to bull sperms, they were immobilised in the peritoneum of the guinea pig. But recent experiments with rats and also with rabbits show that though it was possible to produce a high titre of antibodies in the female of the species to the sperm the females still continued to be fertile in mating. Thus this field of enquiry requires further work.

In certain other experiments subcutaneous injections of sperms have been reported to produce immunity for periods up to a year and re-vaccination could prolong the immunity. Others question the validity of these results and further study is necessary before a final verdict can be made.

It is recognized that exceptionally a particular female may be infertile to sperms from a particular male, usually the husband This might be due to an acquired immunity for the specific sperms caused by a prior local inoculation through wounds in the genital tract. Theoretically it seems it should be possible to immunise individuals to specific sperms of the marriage partner though not generally for all human sperms. The full possibilities and implications of such a move will yet have to be successfully proved.

Also attempts have been made to inhibit the action of hyaluronidase and to use such inhibition for the control of conception. As we have noted before substances that inhibit or destroy hyaluronidase are present in serum. Whether it would be possible to produce these in very much larger concentrations in the body and its fluids as to inactivate the hyaluronidase released by sperms and whether such a method would be advisable are moot questions. I leave these problems after raising them ; they are for the future.

Conclusion

We have surveyed what apparently appeared to be a familiar topic ; but as we traversed the ground with an enquiring mind many unfamiliar facts and views presented themselves. There are immense gaps in our knowledge on some ordinary things bearing on the matter. Still from facts at present available to us we have raised a line of reasonable argument that has brought out many interesting side lights.

The basic conclusion seems acceptable even now ; though more evidence may be adduced by studies in future. That basic conclusion is that dead sperms apart from their recognized role in releasing hyaluronidase to facilitate fertilization, play a very beneficial role in the biological economy of human life. The absorption of their disintegrative

products confers great advantages to physiological functions and somatic efficiency. Such absorption fosters the physical well being of the happily mated woman for which she is in debt to her male partner. Similar absorption within himself in the sexually continent male conduces to his better physical efficiency by the utilization for his own personal benefit of nature's wise provision for the perpetuation of the species.

References for further study.

Allen, E. (Edr.) Sex and Internal secretions. 2nd Ed. William & Wilkins, Baltimore, 1939.

Bullough, W. S. Vertebrate sexual cycles. Methuen, London, 1951.

Cowdry, E. V. (Edr.) Special Cytology. 2nd Ed. Vol. III. Hoeber, New York, 1932

Duran-Reynals, F. (Edr.) The ground substance of the mesenchyme and hyaluronidase. Annals N. Y. Acad. Sc. **52** : 943–1196, 1950.

Hammond, J. and Marshall, E. H. A. Reproduction in the Rabbit. Oliver & Boyd. London. 1925.

Mann, T. The Biochemistry of semen. Methuen, London. 1954.

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INTRAMURAL THROMBUS SIMULATING CONSTRICTIVE PERICARDITIS

by

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A thirty year old male was admitted in the C. M. C. Hospital on 26–7–'56 with the chief complaints of dyspnoea, oedema of feet, giddiness on exertion and increasing weakness since December 1955, and distention of abdomen, pain in the chest and severe anorexia for a period of six weeks. As the patient appeared exhausted and somewhat irrational, the initial history was obtained from his mother. She stated that the patient first complained of cough with mild dyspnoea in September 1955 and received few injections of Penicillin and sedatives without much relief. The x-ray of chest at that time revealed enlargement of heart. As dyspnoea and cough increased patient's relatives took him to Madras in December, 1955. By this time he experienced pain in the chest, profound weakness and poor appetite. He was treated at a nearby hospital for congestive heart failure and was in and out of it for 6 months. The attending physician sent him over to this hospital with a tentative diagnosis of Constrictive Pericarditis during the last week of June, 1956.

On entry here the patient was seen to be a young man with marked pallor and obvious dyspnoea. His lips and tongue dry, neck veins engorged and pulsating. His temperature was 97·8 and marked stomatitis was present. Mentally he was mildly disorientated but passively co-operative. There was no puffiness of the face and no clubbing or cyanosis.

There was some enlargement of the heart causing preicordial bulge and the cardiac impulse was faintly palpable in the 5th left interspace just outside the midclavicular line. Heart sounds were of poor quality, first sound was soft and blowing grade 1 murmur in Mitral and Pulmonary areas, and Pulmonary second sound were soft. A mid-diastolic murmur was present in the Mitral area. Pulse 96/min, poor in volume and paradoxical. The B. P. readings averaged 115/90mm. Hg.

Respiratory system: The trachea was in the midline. Chest symmetrical and movements limited over both bases. Lungs revealed numerous rales and pleuritic rub was present on the left side.

Abdomen: Protuberant, liver was greatly enlarged extending to the right iliac fossa, tender and not pulsating. Spleen was not palpable. Evidence of free fluid was present.

Skeletal system: Pitting oedema of both feet was obvious.

A tentative diagnosis of

(1) Congestive heart failure or

(2) Constrictive pericarditis was made.

Course in the Hospital:

Patient was started on a regimen based on Oxygen, sedatives, Digoxin and Mercurials to which he did not respond satisfactorily. Pertinent laboratory data were as follows:—

Hb 17·00 gm%. RBC 5,760,000 million cmm.

WBC Varied from 10000 on admission to 30000 just before death.

Differential:

Poly 61 to 83%
Lymphocytes 35 to 41%
Eosinophils 3%
Monocytes 1%

Platelets: 117,000 cmm%

Sedimentation rate: 12 –1st hour.
26 –2nd hour.

Prothrombin time: Control 17 sec.

Patient's on admission 105 sec.
Before surgery 22½ sec.

Vandenbergh weak positive. Icteric index 8 units.

Total Protein 6·8 gm% on admission
5·7 gm% before surgery
Alb/Glob 3·2% / 2·5%
Alkaline Phosphatase 14 units.
Thymol turbidity 2
Urine showed no abnormality

Venous pressure was 270 mm. of water.

Circulation time: Arm to lung 3 sec.
Arm to tongue 28 sec.

E. C. G.: Showed auricular rate of 106 per minute. PR interval 0·16 sec. P waves 2·5 mm; QRS 0·08 sec. Occasional ventricular premature contractions seen. Q–T interval 0·32. The electrical position of the heart – indeterminate. T waves isoelectric in all the limb leads. All the leads showed low voltage. The precordial leads V3 showed Q–S complex and raised S–T segment. V5 – normal QRS and depressed S–T segments.

Fluoroscopy: Heart appeared to have a narrow pedicle and widened out towards the diaphragm. Superior venacaval shadow was conspicuous. The right border of the heart was displaced to the right. The cardiac pulsations were virtually very poor. There was bilateral pleural effusion and the lung fields revealed poor air entry but no congestion.

X-rays of chest taken on 24–3–56 and 4–5–56 showed some enlargement of cardiac outline with bilateral pleural effusion. The film taken on 28–6–56 showed no significant change in the Cardiac outline and the pleural effusion was about the same. These findings were consistent with but not diagnostic of pericardial effusion.

The chest was aspirated 6 times and paracentesis of abdomen was done twice.

The pleural fluid: Golden yellow in colour. Protein content was 1·5 gms%. Cells were 60/cmm with differential of Polymorphs 40% and Lymphocytes 60%. No bacteria in direct smear and no growth of organism in culture. No tubercle bacilli were grown in the special media. Peritoneal fluid had a protein content of 1·8gm%.

In addition to the above mentioned therapy patient received supportive therapy such as vitamins, I. V. glucose, proteins and antibiotics. Anaemia was corrected by the administration of iron and blood transfusion. Improvement was very slow. On 20–7–56 when patient's condition was a little better Cardiac catheterization was done with a view to evaluate the intracardiac pressures which were as follows:

Right Pulmonary wedge	30/20 mm. Hg.
Main Pulmonary artery	55/25 mm. Hg.
Right ventricle	55/10/5 mm. Hg.
High right auricle	35/10 mm. Hg.

This test revealed that there was increased pressure on the right side of the heart with moderate pulmonary hypertension and did not confirm constrictive pericarditis.

Patient's condition began to deteriorate. Skin was cold and clammy. Tongue was red and glazed, cheilosis present. He complained of fainting feelings. Mentally patient became more irrational and psychic. Sometimes he was actually drowsy.

Heart sounds varied a great deal in quality. Sometimes there would be a diastolic rumble or a presystolic murmur in the mitral area, at other times there would be no murmurs at all. Triple rhythm was present. Pulse poor in volume. Pulsus paradoxus was still occasionally noted. Veins in the neck were more engorged and undulating waves could be seen. Liver enlargement increased. Urinary output had been low ranging from 25 ounces at the time of his admission to 12-16 oz. during the last week of his life.

Lungs revealed some congestion in addition to bilateral effusion. Blood pressure was 100/80. Patient's appetite was very poor throughout his stay.

From the above findings neither the diagnosis of Constrictive pericarditis could be ruled out, nor was the causation of intractable heart failure evident. We wished to give the benefit of the doubt and the Cardiac Surgeon was requested to do a thoracotomy. Patient's condition was very poor from afternoon of 4-8-56. The evidence of malnutrition became very severe.

Thoracotomy was done on 9–8–56. Due to the patient's very poor condition he was almost completely unconscious from a very small dose of premedication and his systolic blood pressure dropped down to 70 mm. Hg. Therefore the thorax was opened under local anaesthesia. Xylocaine was used. There was no evidence of any pericarditis and on direct palpation of the heart no thrill or any intracardiac mass was detected. The heart appeared pale, flabby and large with a definite bulge to the left. Although the patient's condition seemed to remain about the same during the operation and the closure, his pulse and blood pressure became imperceptible as the skin sutures were being applied.

Permission to do a partial postmortem was obtained. Through the thoracotomy wound the heart was removed with great vessels intact.

Post Mortem: External appearance-Oedema of the legs. Face pale. Cyanosis present. Ascites +. The body was that of a young man under-nourished. Height 5' 5". There was the usual thoracic incision present on the left chest wall between 4th and 5th rib. There was a bed sore present on the right buttock and venesection wound on the left leg. The incision was opened and through that the partial postmortem was done.

Respiratory system: Trachea normal. Left lung weighed 187 G. Both external and cut section appearances normal. Right lung weighed 194 G. Vessels and bronchi normal. Cut section showed mahogany colour of the lung but no induration. There was one pint of haemorrhagic fluid found in the chest.

Circulatory system: Pericardium showed a scar of a recent incision measuring 5 cm. There was no thickening of the pericardium. There was well marked dilatation of the right side of the heart. On cut section the right ventricle measured 7 mm. in thickness. Left measured 14 mm. in thickness. The tricuspid valve was 13 cm. in circumference. The pulmonary valve 6·5 cm. in circumference. Aortic valve was 2 cm. in diameter and showed no regurgitation. There was a tumour found in the left ventricle. 0·5 cm (5 mm) of the mitral valve was free and the rest grossly

deformed by the tumour mass which was apparently involving it by growing up into it from the papillary muscle.

Figure shows heart opened from the posterior aspect. Arrow points to bulbous tumour-like mass attached by a broad base to the wall of the left ventricle. The chordae tendinae of the mitral valve was partially enveloped by this mass.

Tumour was a broad based object growing on the anterior wall, the base was 4·5×3 cm. It extended outwards for 3·5 cms. with the bulbous tip measuring 2·5 cm. in greatest dimension. The endocardium of the lower 2 cm. of the interventricular septum was heaped up being somewhat fibrotic and thickened; and smooth in the upper third of the lesion and fibrinous in the lower 2/3. Left auricle somewhat enlarged. The valve was thickened to 2 mm. The aorta showed tranverse and raised patches. Abdominal organs were felt through the thoracic opening. There was ascites.

Liver enlarged in size, surface smooth, edges sharp and the cut surface showed marked nutmeg appearance.

Spleen weighed 100 G. the surface was smooth and cut surface showed marked congestion.

Kidneys: Both the kidneys were felt to be quite normal. The left kidney was removed. Weighed 150 G. The medulla and cortex were differentiated and the cortex measured 7 mm. Both sides ureters were traced down to the bladder and nothing abnormal found. Gastro-intestinal tract was felt to be quite normal.

Tentative diagnosis: Tumour left ventricle, dilated right ventricle.

Microscopic findings:

Heart Tumour? Specimen is apparently largely amorphous thrombotic material with some organization process.

Liver: Marked acute passive congestion with parenchymal cells absent in the center and pools of blood.

Kidney: Showed apparently normal structure.

Spleen: No significant lesion.

Lungs: Markedly thickened alveolar walls, many pigment-filled macrophages and some areas of atelectasis.

Thymic Tissue: Largely fat with scattered lymphoid islands containing old Hassall's corpuscule.

Final Summary:

1. Acute right heart failure due to ??
2. Thrombotic (?) tumour masc left ventricle.
3. Dextro deviation of interventricular septum.
4. Brown induration of lungs.
5. Acute severe passive congestion of liver.

Discussion :

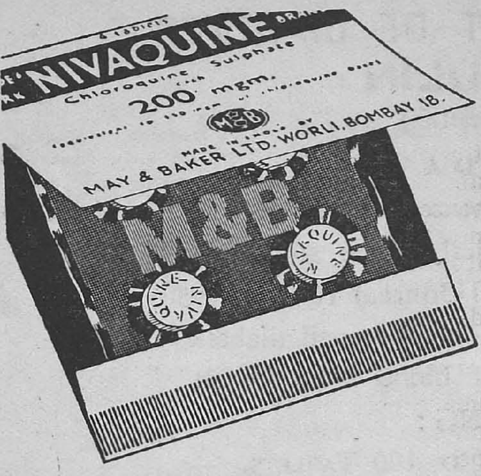
It is of great interest to note that this patient had relentless Cardiac failure without any history of heart disease. We could not elicit any past disease which could be attributed to the Cardiac failure. There was no history of rheumatic, hypertensive or luetic heart disease. The other etiological factors such as acute infections, thyrotoxicosis and arteriorsclerotic conditions were also absent. The history of syncopal attacks with palpitation and precordial pain, occasional change in the quality of murmurs, dyspnoea and cyanosis, progressive intractable congestive failure, lack of therapeutic response to digitalis and cardiac arrhythmia favour the diagnosis of intra cardiac tumour. The mitral diastolic and occasional presystolic murmurs were due to the large thrombus occluding the mitral orifice to a great extent. The clinical findings of our case were similar to the reported cases of pedunculated tumours of the left atrium. Pritchard in his extensive review of literature on Cardiac tumours has said that the most frequent primary tumour of the heart is myxoma. It is a benign growth constituting 50% of primary Cardiac tumours. Clinically the Myxomas have been associated with signs of mitral stenosis. These are found almost exclusively in the atria, roughly 75% occur in the left atrium. He found out of the last 49 cases one tumour arising from a valve and one in the left ventricle. Most of the tumours have produced some degree of obstruction to the mitral or tricuspid valve. Microscopically the tumour is described as poorly cellular and composed of loose tissue of varying vascularity. Though Prichard considered myxomas to be thrombotic in origin, it has not been accepted by many others. The real nature of myxomas is still under dispute.

The findings of dextra-deviation of the interventricular septum at Postmortem might explain the increased right auricular pressure, distended neck veins, enlarged liver and ascites simulating constrictive pericarditis.

I wish to acknowledge my gratitude to Dr. Betts and his team for the help they rendered. Dr. Hadley and his team for the Postmortem findings and Dr. Joshua who has been with me in treating the patient.

REFERENCES

1. American Heart Journal Vol: 40 Aug. 1950
2 American Heart Journal Vol: 39 June. 1950
3. Archives of Pathology Vol: 49 — 1950
4. American Journal of Medicine Vol: 10 — 1951
5. Archives of Pathology Vol: 51 — 1951
6 American Heart Journal Vol: 43 — 1952
7. Archives of Int. Medicine Vol: 91 and 92, 1953
8 Archives of Int. Medicine Vol: 38 — 1952
9. British Heart Journal Vol: 13 — 1951
10 British Heart Journal Vol: 13 — 1952
11. Journal of Clinical Pathology Vol: 5. — 1953
12. Proceedings of the Staff Meetings of the Mayo clinic ... ... Vol: 27 — 1952



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MANAGEMENT OF BREECH PRESENTATION

by

Dr. E. V. Kalyani, M. D., Madras.

A Breech Presentation is a longitudinal presentation in which the buttocks or the lower extremities present at the pelvic inlet. It occurs in 2 to 4% of all the deliveries including premature and full term deliveries.

Dickman reports incidence in excess of 4%. Morton, Danforth and Potter report incidence between 3 and 4%. The relatively high incidence of breech presentation in the smaller weight groups would naturally account for greater number of breech deaths on the basis of immaturity and prematurity.

Government Hospital for Women and Childern: From 1950–1953 the total number of deliveries were 35,778 out of which there were 1040 breech deliveries, giving an incidence of 2·85%.

Etiology:

In the later months of pregnancy head-presentation occurs from a process of accommodation of foetal ovoid to the uterus and breech presentation may occur when this process is interfered with. These factors do not come into play in the earlier months, when breech presentations are much more common than at term. These factors are lacking in hydramnios and twin pregnancy. Breech presentations are commoner in multipara due to flaccidity of the uterine and abdominal walls. The presence of gross obstacles to the engagement of the head like plasenta praevia or hydro-cephalus may produce a breech presentation. Pelvic contraction contrary to the impression does not contribute to breech presentation to any appreciable degree. Sometimes a breech presentation is seen repeatedly in the same woman. This habitual breech presentation may be due to partial septum extending half-way down into the uterine cavity, abnormality of the size and shape of foetal head, abnormality of the uterus etc.,

Management of Breech Presentation:

In recent years there has been a number of papers in the British and American literature concerning the management of breech presentation. The relatively high foetal mortality in breech presentation has not been fully explained. Many authors have pointed out a high incidence of premature delivery in breech presentation and this may contribute to the increased mortality. Others have pointed out that the etiology of the breech presentation is sometimes due to developmental anamolies of the genital tract and that therefore the physiology of genital tract is impaired. Major complications of the pregnancy which bring about the premature delivery would necessarily bring about delivery at a time when the frequency of the breech presentation was high as compared to delivery at term when many of the breeches would have spontaneously been converted to vertex.

Foetal Mortality by different authors in their series are given below:

	Gross Foetal Mortality	Corrected Foetal Mortality	
Doreen Dalery and Michael	13·1%	3·0	
R. G. Law-University College Hospital	12·5%	1·0%	
Dickman		3·2%	
Government Hospital for W and Ch.	35%	5·2%	1950
		1·3%	1951
		1·7%	1952
		2·1%	1953
		Average 2·5%	

The high incidence of foetal mortality probably justifies external version in breech pregnancy. This may be done without anaesthesia in the 32nd week in the primi gravida and a little later in the multi gravida with a lax uterus. If this fails another attempt may be made in the following week unless scanty liquor amnii or any other condition makes it appear hopeless. This procedure is not without foetal mortality. Forceful manipulation should not be done and if pain is produced the attempted version should be abandoned. Ruptured membrane or bleeding contra indicates this procedure. When version has not been successful a detailed X-Ray pelvi metry in all the primi gravida and some multi gravida has to be done. It is said that there is a high proportion of anthropoid pelvis noticed. Induction of labour at term is thought of by some but if delivery is more than two weeks overdue medical induction is advised to avoid post-maturity.

Labour :

A long labour should be anticipated in breech presentation and interference should be avoided unless complications arise that necessitates rapid delivery. Rest, sedation and adequate fluid intake will guard the mother from exhaustion. The membranes must be preserved if possible by keeping the patient in bed and by gentleness in vaginal examination.

LABOUR IN BREECH proceeds exactly as it does in head presentation but few points need stressing.

1. **In-co-ordinate uterine action**: **or inertia** may be present. This complication is the worst that can happen in any presentation but it is much worse in breech presentation. Very often in these cases due to abnormal contraction of the uterus, foetus shows evidence of distress and any delay in delivery is fatal to the child. In such cases with a vertex one may justify stretching the cervix and putting on forceps but in breech cases even an experienced operator does not succeed except in a small proportion of cases. Cervix which appears to be fully dilated may contract about the shoulders or the neck. So in the presence of abnormal contractions caesarian section is the safer method of delivery.

2. **Foetal Distress:** Compression of the cord occurs for a longer time in breech delivery than in head presentation. In cases where there is some sign of foetal distress asphyxia may develop further before the delivery is finished spontaneously. So in these cases if anoxia is present one should extract the baby under anaesthesia if cervix is dilated or deliver abdominally if it is not.

3. **Prolapse of the Cord**: Cord prolapse in breech is sometimes thought to be harmless. The breech does not fill the pelvis and the cord may not be compressed. In most cases impairment of the umbilical flow occurs with grave prognosis. When the cord prolapses in either a breech or vertex, immediate delivery is indicated.

There are three methods of vaginal delivery:

1. **Spontaneous breech delivery** : The Mother delivers the breech spontaneously without any aid from the obstetrician. The breech is born without episiotomy followed by the shoulders and head. This method often results in maternal exhaustion, lacerations and foetal asphyxia and is not employed except in the case of very small or premature foetus.

2. **Assisted breech delivery** : In this method the patient is allowed to use her pains to bring the breech down to the pelvis floor at which time episiotomy is performed under local anaesthesia or a short induction of general anaesthesia. The breech then will be born spontaneously by lateral flexion. The feet are disengaged from the vulval orifice and the

foetal back kept upwards by rotation. An assistant maintains gentle pressure on the fundus over the foetal head to maintain flexion. The obstetrician gently guides the body through the vulva down to the level of the shoulder girdle. The anterior shoulder is delivered by lateral flexion thus sweeping the hand and arm downwards. The posterior shoulder is similarly handled, by raising the body. The Assistant keeps gentle pressure on the head during its engagement into the pelvis and when the head is in the pelvis it may be delivered with forceps or by traction maintaining the flexion attitude.

3. **Breech extraction**: This is reserved for cases when prolongation of labour will endanger the mother or foetus. Cervix must be fully dilated. Pelvis must be adequate. Complete anaesthesia must be administered. Episiotomy is done when necessary. The obstetrician inserts the hand into the vagina and both the legs are brought down and the child delivered following the natural machanism.

According to L. Woodcox, Newzeland, breech delivery is described as a prime example of obstetric art, judgment, patience and technique, all playing their part.

There are many different methods of assisting breech delivery.

1. Burns and Marshalls of Liverpool introduced a method known as Liverpool technique.

2. Lovesat of Burgen.

3. Potter of Buffalo.

In the Marshall method, manipulation is less and it is very elegant to the onlooker.

Results of Liverpool Technique: In 1950, before the North of England obst and Gyn. Society, the records of 2098 consecutive cases of breech delivery were presented by Cox. In this were 1004 cases of single pregnancy uncomplicated by placenta praevia, preeclampsia and other serious disorders. In addition there were 125 caesarian sections for breech presentations. This series extended over 16 years. In 1934, the overall foetal martality attributed to breech delivery alone was less than 5%. As the technique came into general use foetal mortality was gradually declining.

1944-48	...	Foetal Mortality in 374 cases	... 3·21%
1949–52	...	do. do. in 249 cases	... 2·41%

These are cases performed by Marshall and his colleagues of Great experience as well as house surgeons, students and pupil mid-wives. *Description of the Liverpool Technique in a primi gravida when the legs are extended.*

Labour: Conduct of labour is not different from vertex presentation. The usual sedative pethidine, morphine or hyoscine is given when the pains distress the patient and the cervix is two fingers dilated. When full dilatation is near, additional pain relief with trilene or nitrous oxide and oxygen is given. A vaginal examination is always made when membranes rupture to rule out prolapse of the cord. The delivery is conducted in the lithotomy position. (The bladder is emptied).

When to begin delivery: The exact timing of assistance is most important in bringing about a smooth delivery. In primi gravida and multi gravida with large foetus the time to begin delivery is when the foetal anus is seen at the height of uterine contraction. If assistance is given too soon, undue force is necessary for its extraction. An episiotomy is made at this time and foetal buttocks will be extended spontaneously and the delivery begins. When the anus has not appeared however strong the uterine

contractions may be or however big the episiotomy is made groin traction is necessary. The foetal anus comes into view just over an hour or within one and half hours from the time of full dilatation of the cervix. When the buttock is through the bony outlet lateral flexion of foetal spine occurs and the breech curves forward and the vulval orifice opens widely. Further progress is usually slow.

Episiotomy :

This should be done always in a primi gravida and most of the multi gravida. The two important reasons for this are 1. more room is available at the outlet for any manipulation, 2. part of the pelvic curve is obliterated and the hanging down of the child at a later stage is made easy.

The Extraction of Buttocks and Legs and Body :

This stage is done by the mother's voluntary effort. Slight traction may be necessary. Once the buttocks slip through the vulva, the sacrum rotates anteriorly. Now this is the time for the obstetrician to assume complete control. Anaesthesia is induced and when the uterus is contracting the buttocks, legs and body of the child are delivered. The cord is drawn down so that it cannot become tight. But no attempt is made to feel the pulsation. If pulsations are feeble there is a tendency to hurry up the labour which is the thing to avoid.

Freeing the Thorax and arms :

The ankles are held with a towel and traction is made keeping the shoulders of the child in the sagittal plane of the mother. The child may make respiratory effort and this should not cause any alarm. Wrapping of the body with a warm towel is a waste of time. The angle of the anterior scapula is visible. The anterior arm is freed by running the fingers up the humerous to the elbow. Now the body rotates bringing the back in front and the posterior arm if not freed, may be released. As the body hangs the head descends and rotates so that the occiput is behind the symphysis pubis. Further descent with flexion occurs until the nape of the neck is visible at the vulva.

Delivery of the head :

Traction of the ankles towards the floor with supra-pubic pressure by the Assistant will help. Then grasping the ankles the foetus is swung through a wide arc. This action pulls on the head using the lower border of the symphysis pubis as fulcrum. When the mouth is seen, air passages can be cleaned.

Completing the delivery with forceps :

By applying forceps cerefully the head is extracted slowly, and sudden distortion prevented. Piper forceps is used and is applied only when the face is visible, when the head is grasped with forceps. 1·0 mgm. ergometrine is given intravenously. This separates the placenta and allows retraction of the upper segment. Placenta is expelled and episiotomy sutured.

This is the Liverpool technique in detail.

Results of Vaginal Delivery in breech presentations :

Spontaneous Breech Delivery :

Here the delivery being inevitably rapid the risk of intracranial trauma is considerable more so as the baby is premature.

Breech extraction :

Although this is recommended by some as a routine, the necessary manipulations greatly increase the foetal risk.

Assisted Breech delivery :

Here the delivery is effected by maternal efforts, assistance being given to the

arms and head. The dangers of uncontrolled delivery are minimised, and the risk of trauma reduced.

Caesarean Sections:

The indication for this are.

1. **Disproportion**: In the presence of disproportion the foetal risk is extremely high. Caesarean Section is the choice treatment to avoid any trauma to the child. The case that is difficult to assess is one with mildly contracted pelvis and normal sized baby. The necessity of meticulous evaluation of the pelvis from the stand point of measurements and architecture is very important. Even minimal degrees of contraction cannot be ignored in breech presentations, even when breech is of average size. In a vertex presentation a trial labour will be undertaken. A trial of labour in breech is a rather difficult undertaking. A trial of labour in breech is made by assessing the progress with the onset of labour. If the breech engages the pelvic brim, the cervix dilates rapidly and full dilatation occurs within the usual period, the outcome will be favourable. If the breech remains high inspite of good contractions the disproportion exists and abdominal delivery should be resorted to.

2. **Elderly primi parity**: Foetal mortality increases with the age of the patient owing to increased incidence of uterine inertia and operative deliveries. A decision in favour of caesarean section is made very often and is further influenced by the length of time married. the attitude of the patient towards labour and the degree of coneern over the safety of the baby.

3. **Past obstetric history**: History of one or more stillbirths or neo natal deaths, previous operative delivery will be indications for Caesarean section.

Foetal Mortality:

The overall mortality in breech is given as 12·12% in a series of 1544 cases delivered at Lewis Memorial Hospital and the corrected figure in the uncomplicated cases 4·12%. In another series of 465 infants by Daley and Michael it is 13·1%. Uncomplicated 2·6% Dickman's corrected mortality is 3 2%. Women and Children Hospital, Madras from 1950–53 in 1040 cases was 35%. Corrected figure 2·5%. The corrected foetal mortality is the mortality due to breech presentation as such and its management. The overall mortality is the mortality in all cases of breech presentations with or without complications.

Complications:

A complication is regarded as some factor other than the abnormal presentation which may increase the foetal risk. The Royal College of obstetricians and Gynaecologists has recommended for a Maternity Medical Report, the following as complications; Contracted pelvis, placenta praevia, twins, toxaemia and prolapsed cord. Others have included prematurity, gross congenital abnormality, haemolytic diseases of the new born, accidental haemorrhage, maceration of the foetus and prolongation of labour for over 48 hours.

Prolongation of Labour: may not be a complication but a result of the abnormal presentation. But prolapse cord recommended by the R. C. O. G., also may be a result of abnormal presentation.

The complications in our serics of 1040 cases during 1950–53 were:

Twins ...	176	17%
Pre. Ec-toxaemia	87	8·14%
Cord Prolapse	47	4·51%
Acc. Hge.	42	4·4%
Eclampsia	17	1 63%
Hydramnios	29	2·78%
Pl. Praevia	13	1·25%
Anaemi	9	·86%
Cont. Pelvis	9	·86%
V. D. H.	2	·02
Cong. Defects	15	·4%
Cont. Ring	1	·01%
Cervical Dystocia	2	·02%

Causes of Foetal Mortality in Breech Deliveries:

1. **Cases**: complicated by any factor which in itself causes risk to the foetus. Such features are syphilis, diabetis, cordiac diseases. Pulmonary Tuberculosis, pre-eclampsia, placenta praevia, abruptio placenta, prolapse of the cord, Rh. negative patients with anti-Rh titres. In any such case, the foetus is exposed to double risk.

2. **Cases not so complicated**: Here the risk is from the presentation alone, and the method chosen for delivery. These cases are divided into two groups.

a. Mature infants with weight of five pounds or more.

b. premature infants with weight less than five pounds.

As the weight of the baby decreases the mortality markedly increases.

3. **Prolapse Cord:** This is more likely to happen with a double breech than with a single breech. The modern trend of performing a caesarean section for cord prolapse early in labour will doubtless reduce the morality.

4. **Parity**: The multipara have a greater foetal loss than the primis due to higher percentage of premature babies.

5. **Method of Delivery**: The spantaneous group has a higher loss of foetus due to prematurity. Assisted breech delivery shows the lowest mortality. Breech extraction carries a higher mortality than spantaenous or assisted deliveries.

6. **Foetal Mortality** in relation to various accoucheurs as shown in the report by the Department of Obstetrics and Gynaecology, Montreal Hospital:—

	Deliveries	Foetal Deaths	% age
By Trained Obstetricians	259	25	9·6%
By Courtesy Staff	84	10	11·9%
By Junior Staff	41	9	22%

In conclusion, in patients with a normal ante natal course without major complications of pregnancy the foetal mortality in breech presentations is definitely higher than when the baby presents by the Occiput. The mortality is not 10% as is apparent from an overall figure but somewhere between 2 to 3% excluding complications. This figure is dependent on the method of management of the breech presentation. Breech extraction as a method of routine is less favourable, than spontaneous breech deliveries and assisted breech deliveries. The technique of assisted breech deliveries as a piece of Obstetric art has to be practised. One must be trained in a particular method and then must practise it. In assisted breech deliveries the mother must put the buttocks "in our hands" before assistance is given. There is no need for speed but gentleness and skill of manipulation are more important. Early deep episiotomy is essential. In borderline pelvis when trial of labour may be recommended in cephalic presentation such a procedure may not be recommended with a breech presentation. The advantage of Caesarean section in the presence of some of the complications has been indicated by the figures. Prolapse of the cord is more frequent in the breech presentation and quick delivery is advised. The presence of a skilled assistant is very important to guide the after coming head into the pelvis.

The application of Piper forceps as a routine to the after-coming head has not been agreed upon by all but it should be available in the cases when it is necessary.

Place of External Version in Breech Presentation:

I have not dealt at length about the place of external version in breech because the reports are very controversial. I will mention few controversial points about this procedure.

1. **The Time in Pregnency when it should be done**: It seems most logical to

wait until nature has given an opportunity to effect the version spantaneously. Apparently there is no time in pregnency when one may say that the chance of spontaneous version is over. Many of us have seen a breech turning over a few days before labour.

2. Whether anaesthesia is justifiable to help to overcome the nervousness of the patient and the spasm of the abdominal muscle. It is realised that harm may be done when the Doctor is not restrained by the discomfort of the patient.

3. The foetal heartrate is checked before during and after an external version. If any changes occur in rhythm, manipulation is to be discontinued. There are others who think little variations are not so dangerous.

4. Contra indications to the procedure are, previous incision in the uterus, multiple pregnancy and placenta praevia.

5. Whether danger to the child as a result of the external version is greater or less than the risk of delivery as a breech.

The unfavourable sequelae mentioned as a result of attempted version of are:

1. Initiation of pre-mature labour.
2. Prolapse cord.
3. Production of Knots in the cord.
4. Separation of placenta.
5. Rupture of the uterus.

Personally, I do not think that such complications arise when the external version is carefully done, in the selected cases. I am of opinion that external version has a very definite place in Obstetrics. To do this the following questions must be answered.

1. What is the object of external version? And is that object attained?
2. Is there a need for version?
3. When should version be performed?
4. Is version safe for mother?
5. Is version safe for foetus?
6. How does risk of external version compare with risk of breech delivery?
7. In which case version is unjustifiable?

External version is performed to correct breech presentation to vertex presentation. It has the object of lowering the incidence of breech presentation at the onset of labour. The need for version is the need to reduce foetal loss which will result from breech delivery. Versions without anaesthesia is safer for the foetus and if possible may be delayed until the 34th week. Version done earlier shows a higher rate of reversion. With no anaesthesia there is no risk to the mother. With anaesthesia the foetal loss is increased. Version is unjustifiable in cases of hypertension, A. P. Haemorrhage and when caesarian section is contemplated.

REFERENCES

1. Breech Delivery in Chicago lying in Hospital American Journal 5—70 pp. 252
2. Breech Presentation ... ... do. 55—69 pp. 977
3. End Results of Breech Delivery ... do. 55—69 pp. 983
4. Five Year Analysis of Breech deliveries do. 55—69 pp. 284
5. Foetal risk in Breech Delivery ... do. 53—60 pp. 492
6. Management of Breech Pregnency—Obstetrical and Gynaeological Survey ... ... 54 pp. 222
7. Problems of uncomplicated Breech Delivery Obstetrical and Gynaeological Survey ... 54 pp. 530
8. Some aspects of Breech Delivery ... do. 55—62 pp. 614
9. Technique of Breech Delivery ... British Empire Journal 55—62 pp. 395

ABSTRACTS

A recent traveller writes in Lancet, Sep.' 14, 1957— " Mr. Cohen and his colleagues tell us that American medical students work far harder than English ones. I am sure that this is correct. However, of the incentives there to learn medicine, they omit the vastly superior conditions of work after qualifying Hospitals and offices (surgeries) have to be seen to be believed. Doctors may be hard worked, but never need rush through the numbers of patients expected of them here. Financial rewards soon after qualifying are enormous compared with those possible here. Doctors are among the richest section of the community. So certain of this future can students be that they frequently borrow large sums to live on while doing courses of study-the whole thing being much more of a business venture.

This is not to be little for one moment their enormous enthusiasm for knowledge and real kindly interest in human beings. And after all no-one who has seen their superb hospitals and the standard of their work could say that a more business-like attitude to medicine is a bad thing.

These standards exist because the American patient beleives in them. The doctors to whom they entrust their lives must be of the highest standard-hence the fierce competition for entry to medical schools and the tremendous amount of work done there. Americans see no reason why those who pass these rigorous tests should not be well rewarded. Equipment must be of the latest and best. Apart from being able to choose their doctor, they demand a decent piece of his time. All this costs a great deal, but Americans rightly value their health.

By contrast, here in England public apathy about good medical standards leaves the National Health Service patient with no choice of physician or surgeon in hospital (50% of the time he is not investigated or operated on by a consultant, but by doctors not yet fully trained in their specialities), a minimum of time to talk to any doctor in or out of hospital, antiquated hospitals, and steady loss by emigration of well trained doctors seeking decently paid job.

If the British public want harder work from their medical students, and thus better treatment for themselves, let them provide better working conditions for future doctors to look forward to.